JPRS L/9863

22 July 1981

Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

(FOUO 8/81)

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SUB-SAHARAN AFRICA

WORLDWIDE AFFAIRS

BRAZIL SUPPLIES IRAQ WITH URANIUM

LD121129 London THE GUARDIAN in English 12 Jun 81 p 6

[Bernardo Kucin's dispatch: "Iraq in 'Secret Uranium Deal' With Brazil"]

[Text] Sao Paulo--Brazil has secretly supplied Iraq with uranium dioxide which can be made into bombgrade plutonium.

An Iraqi Airways plane flew to Brazil in February and collected cases of the uranium, disguised as conventional weapons, according to a reliable source. Another consignment is due next month. Uranium dioxide, when exposed to radiation, decay into plutonium.

The uranium was purified at Sao Paulo's Institute for Radioactive Research, a vast assembly of laboratories where the Brazilian Government is concentrating developments in nuclear energy.

The institute has a research reactor submitted to the usual safeguards, but otherwise is free from outside surveillance. A pilot plant for the uranium purification--which is not to be confused with the enrichment of uranium--has been in operation for more than a decade. It has very limited capacity, but considering the length of time, it is possible that this pilot plant purified the uranium.

About 200 lb of uranium are necessary to obtain 22 lb of plutonium.

The uranium dioxide was delivered in the form of pellets. It was apparently smelted in the special high vacuum furnaces of the institute so as not to absorb impurities.

The pellets of uranium dioxide will decay more rapidly into atom-grade plutonium if submitted to very strong neutron radiation. When submitted to the radiation obtained in existing medium-size research reactors, the nuclear transformation can be produced in a matter of months--if necessary adaptations are made in the machine.

Brazil has developed very special relations with Iraq, following the oil crisis. The rapproachement started when the Iraqis nationalised the large "Majnoon" oilfield, discovered by Brazil's state-owned oil company, Petrobras. They tore up

the agreement, but the Brazilians, as a consolation prize, got a preferential system of oil deliveries.

Brazil has sent General Samuel Alves Correa, a former chief of the combined general staff of the armed forces to Iraq as ambassador, and has been supplying Iraq with armoured cars, ballistic missiles, and other military equipment.

CSO: 5100

JOINT EFFORTS WITH U.S. IN RTNS PROJECT

Tokyo TECHNOCRAT in English Vol 14, No 4, Apr 81 p 58

[Text]

• Japan and the U.S., who are both stepping up their concerted nuclear fusion reactor development activities, have recently launched a joint experimental 'RTNS Project" to study core materials utilizing a large-scale accelerator. made in the U.S.

This giant device is the RTNS at the Lawrence Livermore Laboratory (LLL), and the two countries will conduct irradiation tests on the core wall and other materials over a period of 5 years from fiscal 1981, along with participation in the construction of RTNS2, new accelerator under construction. Based on the agreement for Japan–U.S. nuclear fusion research cooperation signed in May, 1979, the first Doublet III project really took off as a cooperative scheme, producing numerous results like plasma characteristics. The core material joint development plan using the experimental facility is the next largest to Doublet III, and is expected to be just as productive.

Should Japan build an accelerator of the RTNS scale, it would cost a total ¥4 billion and require a five-year period of construction. Therefore single-handed core material development by Japan might take too long to be desirable in this field. Therefore, this collaboration by both countries can be viewed as another primer to boost thermonuclear reactor development as quickly as possible.

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EXPERIMENTAL MULTIPURPOSE HTGR PRACTICALLY ON TARGET FOR 1988 CRITICALITY

Tokyo TECHNOCRAT in English Vol 14, No 4, Apr 81 p 58

[Text]

• The Japan Atomic Energy Research Institute, (JAERI) in promoting the development plan for a multipurpose hot temperature gas cooled reactor, last year initiated the detailed design for a 50,000kW, experimental reactor.

The nuclear steelmaking project aiming at utilization of the reactor heat by reduction, by MITI's Agency of Industrial Science and Technology, was terminated in the previous fiscal year, which somewhat clouded the future of the multipurpose HTGR. Nevertheless, JAERI determines to concentrate on research and development for the construction of an experimental reactor, maintaining that the nuclear capability will in due course have other applications than power generation. In 1969, the institute began R&D of components technology such as fuel, materials, and high temperature resistant equipment. Since fiscal 1978, a large structural components reliability test loop has been set up to establish technology for the gas reactor components. Using this technology, the design detail for an experimental reactor is now underway starting in the last fiscal year.

According to JAERI's work so far, the reactor will be a 50,000kW, helium gas cooled, graphite moderated type using slightly enriched uranium in characteristic pill-like fuel particles. In 1979, JAERI ordered a comprehensive system plan for the experimental reactor from four nuclear component manufacturers with Fuji Electric Co. being appointed technical integrator. The task was completed last year and the detailed design will now go into the concreting equipment structure stage as well as the setting up of overall operation/safety programs. The institute is aiming to achieve criticality by 1988 at the earliest.

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JAPAN

FIRST ENRICHMENT PLANT USING CHEMICAL EXCHANGE PROCESS

Tokyo TECHNOCRAT in English Vol 14, No 4, Apr 81 p 58

[Text]

• Asahi Chemical Industry has been licensed by the Science and Technology Agency to use nuclear fuel materials in a uranium enrichment model plant to be constructed in the Miyazaki Prefecture employing a chemical exchange technique. The company is now seeking construction approval from the local authorities, and is expected to begin work shortly for a proposed start-up in fiscal 1983.

Japan's development of uranium enrichment technology has so far been undertaken in one of their national projects by the Power Reactor and Nuclear Fuel Development Corp. focusing on a centrifuge separation method. By contrast, the chemical exchange process, which is suitable for discouraging nuclear proliferation, has lately attracted attention since the Asahi Chemical Industry developed an anion exchange resin with a greatly enhanced ion exchange reaction rate, and successfully produced 1.9% enriched uranium by means of small equipment at its Kawasaki Branch. Observing the substantial benefits of this process, the government began to consider it as complementary to the centrifuge separation process, and, since 1980, has subsidized the company for technical development work.

The projected model plant incorporates four linked enrichment towers each of 1m. effective diameter and 2.5m high, with a capacity of producing 500kg of 3% enriched uranium a year. For six years, from fiscal 1980 to 1985, the government will finance the firm with two thirds of the total ¥12 billion required to obtain economic evaluation data by the end of the period.

CSO: 5100/4538

PNC EMBARKS ON NEW URANIUM ORE PROSPECTING PROJECTS

Tokyo TECHNOCRAT in English Vol 14, No 4, Apr 81 p 59

[Text] The Power Reactor and Nuclear Fuel Development Corp. (PNC) which is carrying out overseas survey and exploitation of uranium deposits has just embarked, on its next two targets, namely, Niger (Africa) and the Athabasca district of Saskatchewan, Canada. This makes a total of 21 overseas survey & prospecting projects for PNC. Furthermore, the corporation hopes to realize by the late 1980's a commercial plan to transfer some of its 8 big projects, including Mali (Africa) and the U.S., to the private sector. All these at present are being actively worked on.

The price of uranium has recently fallen somewhat mainly due to a slow-down in nuclear power generation, producing a temporary buyers' market. Notwithstanding this, the global competition for uranium exploitation is intensifying. Even Japan, the second runner in the development race for world-wide uranium resources, is currently earmarking a large-scale budget for overseas survey and prospecting--about ¥5 billion for this fiscal year in the case of PNC.

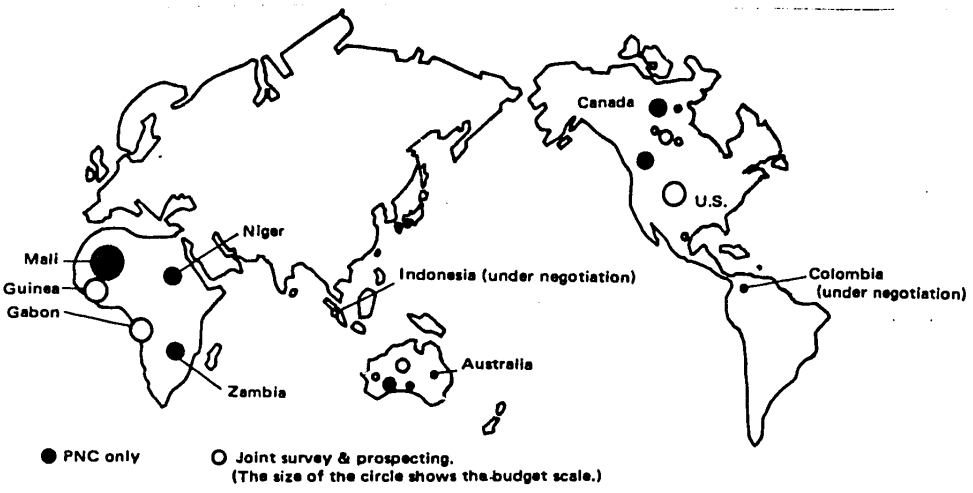

Fig. 1. PNC's Overseas Survey and Prospecting Projects

All told, nine nations are the subjects for overseas survey and prospecting as shown in Fig. 1. Among them, 8 priority projects now being aggressively developed are those at two districts in Australia, two districts in North America and four African regions, with investment and man-power already up to 80% of the total.

The largest one is at Mali, involving in this fiscal year about 260 workers together with a budget of over ¥1.5 billion for survey and exploitation. In contrast, for the Niger and Athabasca projects beginning in February 1981, ¥200 million and ¥100 million respectively have been allocated.

All this shows that Japan's uranium resources survey and prospecting industry, spearheaded by PNC, is gaining a high momentum.

CSO: 5100/4538

SCC STUDY UNDER REACTOR ENVIRONMENTS

Tokyo TECHNOCRAT in English Vol 14, No 4, Apr 81 p 59

[Text] In the autumn of 1974, a water leak accident occurred at a boiling water reactor (BWR) in the U.S. A stainless steel recirculation water pipe had developed hair cracks in the vicinity of welds with residual stress: what is called stress corrosion cracking (SCC). Prompted by this accident, studies on SCC in respect of stainless steel used for BWR have been energetically carried out both at home and abroad. This has yielded a variety of preventive measures with some of them already being applied to actual reactors.

The National Research Institute for Metals investigated SCC in respect of stainless steel under test conditions, simulating the situation of a BWR in constant operation. This revealed for example that the stress of a pipe working in both peripheral and longitudinal directions could cause cracking more frequently than if it was only in a peripheral direction.

Meanwhile, in actual reactors, the number of cracks occurring seemed to correlate significantly with the functions of reactor startup and shutdown. This necessitated experiments to reproduce such operating conditions in addition to normal-run simulation. Accordingly, the institute picked up as a specimen the same stainless steel material as used in existing reactors. The specimen material underwent heat treatment so as to develop cracks and provide a similar crystal structure to the heat affected zone. Employing a circulation testing facility of high-temperature/high-pressure water, the treated specimens were tested under more severe conditions than those during startup or shutdown of normal reactors. From the factors examined, the repetitive temperature change contributed most to the production of cracks.

The graph shows the effect of water temperature on the rupture life under constant stress and dissolved oxygen concentration. The average rupture time was 600 hours for case (a) when the water temperature was held at 290°C to simulate a steady-state operation, whereas it decreased to 250 hrs. in case (b) when the water temperature fluctuated in the 145-290°C range. Thus it was found that cracking in a BWR is also promoted by water temperature changes during startup and shutdown.

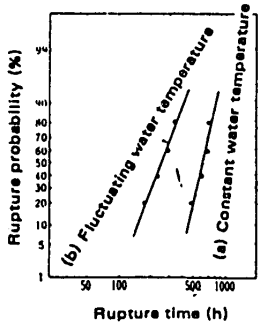

Fig. 1. Logrithmico-normal Plotting for the Repture Life of 304 Stainless Steel Under BWR Conditions

CSO: 5100/4538

JAPAN

PLANS FOR OFF-SHORE NUCLEAR ENERGY PLANT STUDIED

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 7 Feb 81 p 4

[Article: "Location of Nuclear Power Sources; Off-shore if not on Hand; Feasibility Study for Realization; MITI To Set Up an Investigation Committee Soon"]

[Text] Under a 4-year project from 1981, the Ministry of International Trade and Industry (MITI) will pursue the possibility of actualization of a method of locating nuclear power stations at sea, so as to be helpful, even in a small way, in the elimination of difficulties in locating nuclear plants through constructing nuclear power stations at sea. Off-shore nuclear plants are to be constructed by the dock method at water depths of 20-150 meters. They are much expected as medium and small dispersion-type power sources that can be constructed near electric power consumer areas. For this purpose, the MITI decided to set up a Commission for Studying Nuclear Reactors Located at Sea in the near future and to run an investigation and study of the economics, safety, and power transmission systems, and flexibility in terms of selecting the location of the plants per four methods: 1) Float-type, 2) anchoring to the bottom-type, 3) man-made island type, and 4) caisson-type.

The Four Methods: Float-Type, Etc.

Nuclear reactors are considered as oil-alternative energy sources. But, there is a bit of uncertainty as to their safety; and electric power companies are experiencing difficulties in procuring plant sites. According to the MITI, the sites for nuclear power plants which are to commence their operation by 1990 are secured. But, the MITI says that other than those, it will be very difficult to secure sites. Thus, they have conceived an idea of underground and marine-type nuclear plants designed for effective utilization of the land and for environmental safety. Studies of underground nuclear plants have already been progressing under a 4-year project from 1977. From next year, they will be in the stage of establishing a guideline aimed at actual plant construction.

Meanwhile, starting from next year, there will be more and more research on locating nuclear plants at sea. Under the Float-Method, a nuclear plant will be built on a steel box at the dockyard, taken by tugboat into the

breakwater of an intended location, and will be anchored. Under the anchoring to the Bottom Method, a steel box will be constructed, taken by tugboat to a scheduled spot, and fixed in such a way that the space between the ocean floor base and the steel box is little.

Under the man-made island method, the intended sea area for a generating station will be enclosed in a breakwater sea wall and enclosed area will be filled in, hedged off from the open sea. Then, a nuclear plant will be constructed on the man-made island in the same way as those constructed on shore. Under the Caisson-Method, the foundation of the power station facility will be made of concrete or steel caissons with nuclear power plants set on them. The advantages of locating nuclear reactors at sea are: 1) Offshore locating at water depths of 20-150 meters is possible, and a flexibility in location selectivity is increased. 2) It is possible to construct the most part of a plant in a factory, and a large-scale reduction in manufacturing time can be achieved. On the other hand, the disadvantages are pointed out as: 1) The greater the distance from the coast will be, the more difficult the method of transmitting electricity will become. 2) There is a problem in guaranteeing plant safety in withstanding natural conditions such as wind and waves.

There will be a study and investigation, by a commission to be set up in the near future by MITI, of the four methods, the Float-Method, etc., concerning economics, safety; and the possibility of their realization will be pursued. At present, since the difficulties in locating nuclear reactors are being felt, great interest is being concentrated on this unique research of locating nuclear plants at sea.

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JAPAN

SMALLER LIGHT WATER REACTOR UNDER DEVELOPMENT

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 23 Feb 81 p 1

[Article: "Towards Development of Medium and Small Light-Water Reactors; Committee To Be Formed by Industry, Government and Academic World Starting April: Model Reactor in 1983"]

[Text] The Ministry of International Trade and Industry (MITI) which is newly tackling the issue of medium and small light-water reactors to diversity and to supplement light-water reactors which are in the process of expanding will inaugurate a "Medium and Small Light-Water Nuclear Reactor Research and Development Commission" (temporary name) composed of experts from business, government and the academic world, at the end of April. At first, they will start in fiscal 1981, a feasibility study (FS = Development and Industrialization Research) on medium and small reactors capable of having multi-purpose utilization including generating electricity in response to actual regional conditions. They intend to do their planning and general conceptualization of medium and small reactors in fiscal year 1982, based on the FS, and to proceed to a trial production of their model reactor in fiscal 1983. Construction of a small nuclear reactor of the sub-metropolitan (underground) type has recently been planned also in Grenoble, France. The MITI [Ministry of International Trade and Industry] plans to inject more energy into promotion of this medium and small reactor research project.

The reason why the MITI has tackled this development plan is that the MITI has judged that reactor manufacturers have brought about sufficient maturation of light-water reactor technology by having built many light-water reactors, and therefore have acquired enough ability to deal with the new research of new medium and small reactor development. At the same time, the development of medium and small nuclear reactors will make it possible to establish new power sources close to such sites as Osaka and Tokyo where there is a great demand for electric power, and will provide an effective means of distributing a large number of power sources as principal sources of energy for various regions throughout the entire nation.

There is also the appeal of their being able to be set up in the midst of industrial zones and complexes as energy reactors for industry not only as a general source of electricity but also as a nuclear heat source.

Thus, through the diversification of nuclear reactors which are the most important alternative energy sources, the MITI aims at preparing for future society which no longer depends on oil.

In addition, there is also the aim of developing medium and small type reactors for export purposes because the developing countries have started to want them. These are truly multi-purpose reactors. They are designed to have an output of 50,000-300,000 kilowatts. As a result, these medium and small reactors will give variety to the present light-water reactor whose output exceeds 1 million kilowatts.

In 1981, the ministry will stimulate the needs of various medium and small reactors, will conduct the FS in relation to their utilization, and will consolidate the concept of reactors to be developed. The commission will be composed of nuclear reactor manufacturers and the electric power industry as well as government and academic experts. It is intended that the chairman will be selected among those who take a "neutral" attitude.

They intend to set up a working group of specialists under the aegis of the commission and also to entrust a part of the FS to think tanks.

9713-R
CSO: 4105

JAPAN

POLICY TO SPEED UP PLANT SITE PROCUREMENT

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 18 Feb 81 p 1

[Article: "Speeding Up the Location of Power Sources; Rationalization of Regulations and Procedures; MITI To Set Up a Study Meeting; To Review the Review System; Outline by June"]

[Text] As there is an urgent need for hastening the development of large power sources including plants, the Ministry of International Trade and Industry (MITI) has set up a "Study Meeting for Facilitating the Acquisition of Nuclear Plant Sites" (Chairman Teiichi Yamamoto, Chief, Development Branch, Public Utility Department, the Agency of Natural Resources and Energy) within the ministry in order to rationalize the legal and procedural aspects that are the bottleneck for facilitating power source development. And, it has begun reviewing a series of inspection systems, procedures, and laws. They intend to study by June a plan, for rationalization of nuclear reactor safety inspection systems and a reasonable combination of procedures and laws, and to reflect this on a policy for promoting the development of power sources to be implemented in 1982 and thereafter. On the 17th, the Liberal Democratic Party (LDP) also convened the first meeting of the "Headquarters for the Promotion of Nuclear Power Plant Site Acquisition," which is the LDP's organ to promote the development of power sources. Thus, the development of new power sources has come to be a national issue and the MITI's recent moves is a part of it.

It is the general opinion that the laws and procedures associated with the establishment of power plants resemble jungle branches which spread in a complicated manner. Generally, it is said that there are 33 laws and 66 procedures. First, there are those laws that have a principal relationship, such as: The Territorial Utilization Law, The Rivers Law, The Cultural Assets Protection Law, The Natural Parks Law, The Forests Law, The Agricultural Lands Law, laws concerned with the consolidation of agricultural promotion areas, The Land Expropriation Law, The Public Waters Reclamation Law, The Nuclear Reactor Regulation Law, The Power Source Promotion and Development Law, and The Electric Utilities Law. And there are other related laws too numerous to mention.

In the case of a large nuclear plant, especially which, it is anticipated at present would serve as the greatest source of power, tremendous numbers of laws and regulations are controlling it from selection of the site where the plant will be located to commencement of its operation. Safety inspections as well are being designed very strictly.

The strictness of successive legal and procedural investigations is for the purpose of eliminating anxiety and the victimization of local self-governing bodies and the local population. On the other hand, it is a reality that it takes a lot of time and man-power to develop and secure power source that is urgently needed nationally.

In the case of locating a nuclear plant, it is said to take 10-20 years. The cause for this is that it takes a lot of time to dispel the anxiety of the local population and to implement local compensation and indemnities such as the fishing industry. However, the fact that legal and procedural investigations are complex and are strict cannot be overlooked as a cause for the delay.

The Study Meeting established within the ministry is founded on this pressing task of the promotion of power source development, and will insert the scalpel of rationalization to the laws, procedures and investigative systems that are becoming one of the bottlenecks. But a difficult problem is that the MITI does not have exclusive jurisdiction over these laws, procedures and examinations. It is a fact that almost all ministries and agencies have a connection with power source development in some form or other. For this reason, the study meeting will, for the present, concentrate on those laws under the MITI's jurisdiction, and intends to seek for a series of rational combinations of laws and procedures.

To start with, while maintaining the strictness of laws and procedures, they will look for a way to eliminate a waste of time by rationalizing their combinations and, by reconstructing the entire legal and procedural systems, will pursue the possibility of locating power plants in a shorter period of time than heretofore.

Also, in relation to the system of nuclear reactor safety, investigation through studying rational combinations of investigative systems such as simultaneous execution of environmental investigations and safety investigations that are not being done at present, they intend to search out the way to speed up the process without losing the strictness of their investigations and procedures.

The LDP's Headquarters for promoting the locating of power sources which was inaugurated on the 17th, also held up a slogan of smooth and speedy licensing for procedures for the location of power sources. The commencement of the MITI's study may develop into a situation in which all ministries and agencies are involved.

Strengthening of the Support System for Areas Experiencing Difficulties in Locating Nuclear Plants: Course of Action of the LDP's Promotion Headquarters

The LDP opened the first meeting of its "Power Source Locating Promotional Headquarters" (Headquarters Chief: Yoshitake Sasaki, formerly MITI minister) at its party headquarters, Nagato-cho, Tokyo, on the 17th, and decided upon its course of action for the next 2 years. The course of action adopted that day (agreement on the establishment of the promotional headquarters) stated that in order to rapidly promote the location of power sources the whole party must grapple with solutions to such problems as compensation to the fishing industry, and also expressed the importance of developing strong support activities in those areas in which difficulties in locating nuclear plant and drawing local cooperation have been experienced.

Among the concrete activities of this headquarters are:

1) Development of a national movement; holding a study and training meeting of party members in those areas in which power sources are to be located; and holding round table discussions with consumer organizations, city heads, governors and organizing power source location caravans.

2) Support activities in those areas where the location of a plant is facing difficulty by means of providing the Headquarters' support and investigatory activities, organizing people who are promoting nuclear plant location, and providing support to local leaders who are promoting plant education.

3) Promotion of various policies for propelling power source location procedures; efficient enforcement of nuclear reactor safety investigation; strengthening and consolidating the three power source laws; and the luring of plants into areas where power sources are to be located.

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CSO: 4105

BRIEFS

MARINE NUCLEAR POWERPLANT SURVEY--In an effort to build nuclear power stations in the sea to help, if only slightly, relieve the siting difficulty, the Ministry of International Trade and Industry (MITI) is to probe into the possibility of constructing full-scale maritime nuclear plants in a four-year scheme starting in fiscal 1981. The conceived plant would be constructed using a dock system around 20-150m deep. It is hoped it would represent a power source of modest scale which could be located in the neighborhood of a few electricity consuming regions. Accordingly, MITI will soon organize an investigation committee for offshore nuclear power plants to study the four types namely: (1) floating, (2) on-bottom, (3) island, (4) caisson. The study will include potential sites, different power transmission systems as well as factors such as safety and economy. [Text] [Tokyo TECHNOCRAT in English Vol 14, No 4, Apr 81 p 58] [COPYRIGHT: 1981 Fuji Marketing Research Co., Ltd.]

SYSTEM DECONTAMINATION OF RADIOACTIVITY--The Tokyo Electric Power Co. is becoming confident of the technical practicability of a "system decontamination," that will reduce the radioactivity levels of an entire nuclear power facility. The system decon development has been urged not only to ease plant operation but to minimize the exposure to workers. The company has now to formulate the final report on the decon method, costs, etc. However, there is no example of its implementation anywhere in the world so that a definite schedule and a potential nuclear power station subject etc. are still undecided. [Text] [Tokyo TECHNOCRAT in English Vol 14, No 4, Apr 81 p 58] [COPYRIGHT: 1981 Fuji Marketing Research Co., Ltd.]

CSO: 5100/4538

NIGERIA

MINING COMPANY CONTINUES URANIUM PROSPECTING

Paris MARCHES TROPICAUX ET MEDITERRANEENS in French 27 Mar 81 p 841

[Article--passages enclosed in slantlines printed in italics]

[Text] The /Nigerian Uranium Mining Company (Numco)/ is continuing its prospecting in the state of Bauchi and, according to the federal mining and energy minister, Alhji Mohammed Ibrahim Hassan, it may soon be given other concessions in the states of Benue, Gongola, Cross River, Imo, Sokoto and Niger.

We recall that Numco is a /joint venture/ company 60 percent owned by the Nigerians and 40 percent owned by the French company /Minatome/ (which itself is owned 50 percent by /Pechiney Ugine Kulhmann/ and 50 percent by the /French Oils Company)/ in accordance with an agreement reached in late November 1979 (MTM of 14 December 1979, p 3465). On 5 February 1980, the minister had said that Numco would not begin to exploit its deposits in the state of Bauchi, located at Gombe, for 2 years (MTM of 15 February, p 385). On the other hand, we also recall that while for the time being Minatome is the only foreign company licensed to prospect and explore with Numco, Nigeria has not seemed to want to give out exclusive rights. When the contract with the French company was signed, it had in fact signalled that other concessions that might hold uranium could still be obtained by foreign companies and it had mentioned the states of Cross River, Benue (more precisely the Lokoja region) and Sokoto.

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